Project Graduation
Virginia SOL Algebra Tutorial

The Facilitator/Teacher Guide

to the

Project Graduation
Virginia SOL Algebra Tutorial

2006-2007 School Year

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Welcome

On behalf of Virginia Department of Education and The Princeton Review, welcome to the Project Graduation Virginia SOL Algebra Tutorial. This facilitator/teacher guide is intended to provide you with an overview of the tutorial as well as step-by-step instructions on tutorial usage. We recommend that you review the entire guide prior to giving access to your students. We also recognize that everyone has different ways of teaching, and so, as you become more familiar with the Tutorial, we encourage you to find your own use model!

Overview

The Algebra Tutorial was developed as part of Governor Mark Warner's Project Graduation initiative and was utilized by over 3,500 high school students during the 2004-05 school year!

Built on The Princeton Review's assessment platform, Homeroom.com, the Tutorial is designed to identify student academic needs with an online pretest and tailor web-based lessons to meet those needs. After students have completed all recommended lessons, they will be given a final online assessment. Students may review tutorial lessons and retake the final online assessment as many times as they wish.
Although students may engage in lessons from home or school, each school must provide a contact person to serve as a facilitator and mentor to enrolled students. The school facilitator will have access to accounts, monitor student progress and offer individual guidance.

Eligibility

The Algebra Tutorial is available to students in grades 9 through 12 who have passed Algebra I (or Algebra I, Part 1, and Algebra I, Part 2; or have completed the algebra content in an integrated course series) but have failed the Algebra I Standards of Learning assessment. Teachers may also enroll high school students who are at risk of not passing the Algebra I SOL assessment.

For those facilitators who are using the Algebra Tutorial for the first time:

Please review the Unit Plan at the end of this guide for detailed SOL alignment.

Tutorial Content and Structure

The Tutorial is designed to help facilitators/teachers assess students' strengths and weaknesses via customized assessments, analyze student performance with a multitude of reports, and finally, take immediate action by assigning appropriate re-teaching resources. All Tutorial content has undergone a rigorous review by Virginia Department of Education.

ASSESS

Full-length Diagnostic Pre-test: This pre-test contains actual items from previously released SOLs and is completely aligned to the SOL blueprint. All students should begin the tutorial by taking the pre-test in an actual "test-like" setting.

Nine Instructional Units: There are nine instructional units, each with a corresponding unit pre/post quiz. (See Appendix for complete Tutorial Unit Plan).

Full-length Post-test: Students may take a final, full-length practice SOL prior to taking the actual SOL exam. Just like the pre-test, the post-test is comprised of actual items from previously released SOLs and follows the SOL blueprint.

ANALYZE

Performance Reports: Facilitators may use a variety of reports (i.e., individual student performance, overall class performance, item analysis) to diagnose student skill deficiencies. All reports are broken out by SOL reporting categories (*Expressions and Operations, Equations and Inequalities, Relations and Functions, Statistics*).

ACT

Skill Remediation Resources: The Tutorial provides teaching resources for every skill tested on the SOL. These resources include but are not limited to: lesson plans, worksheets and web activities.

A few things to remember….

As you read the next section, please keep in mind the following:

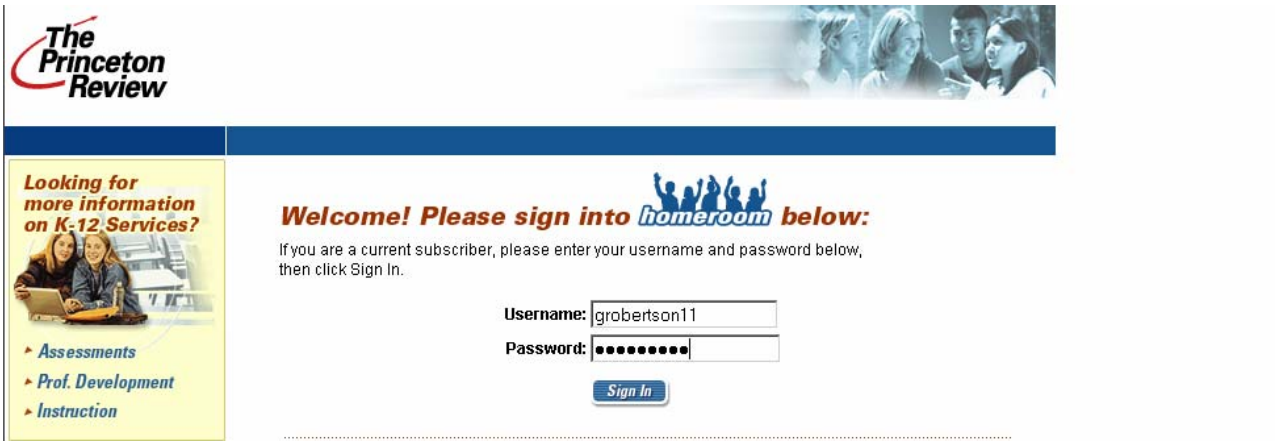
- **The Tutorial CAN and SHOULD be used for targeted remediation** for students who have taken the Algebra I SOL before, but who have been unable to pass it.
- **The Tutorial CAN and SHOULD be used with students who have not yet taken the SOL** and would benefit from exposure to SOL-like content and format.
- **The Tutorial is NOT a magic bullet** and should not be used to simply run students thru a battery of tests without any re-teaching of key concepts in between.

Getting Started – A Step by Step Use Model

1. Facilitators: Sign In

Facilitator Username/Password:
If you have already registered for the Tutorial, please refer to the Welcome email you received from The Princeton Review. If you have not yet received your username/password, please email The Princeton Review's Customer Support Team at helpme@review.com or call 1-888-778-7737.

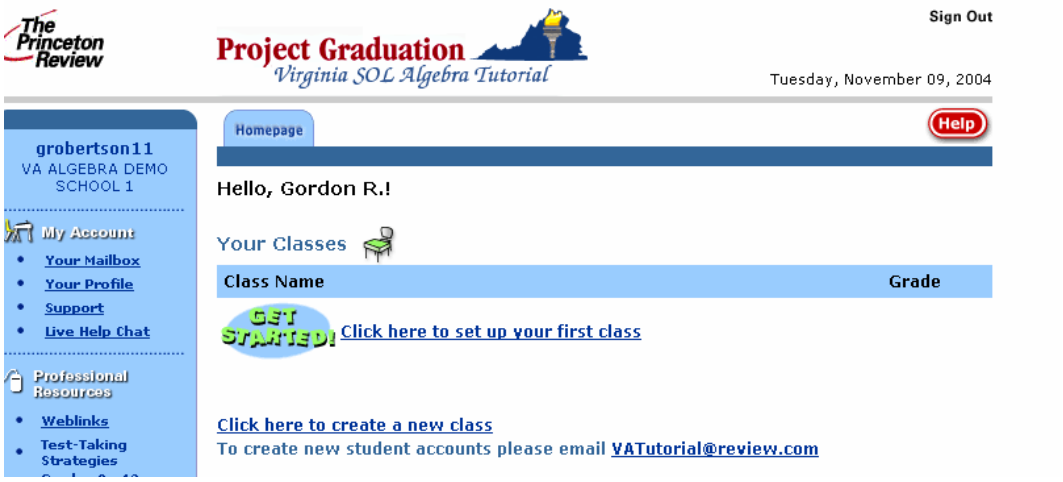
Signing In:
Open up the web browser on your computer and type in the following address: https://ac.princetonreview.com/secure/loginhelp.asp. Enter in your **username** and **password**. Click **Sign In.**



2. Facilitators: Create a Class

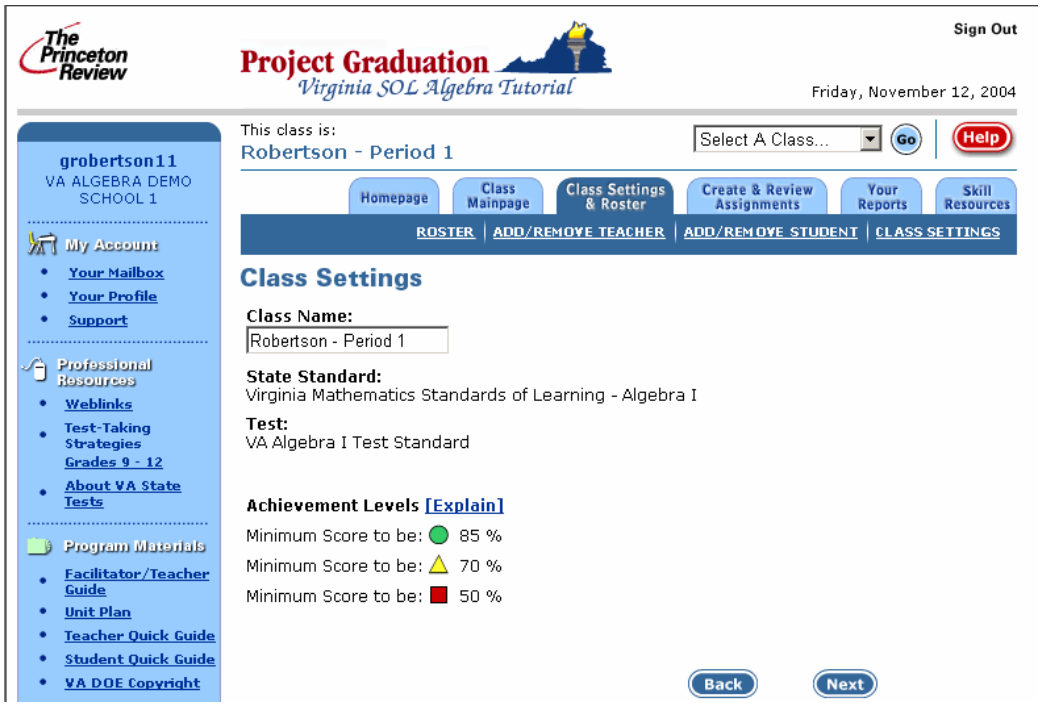
Setting Up Your First Class
Whether you are using the Tutorial with a small number of students or with several of your classes, you must first group your students. This will help you with your overall management of the Tutorial.

From your homepage, click **Get Started!** or **Click here to set up your first class**



On the next page, you'll need to **name your class**. We recommend the following naming convention: Teacher Last Name – Period/Section "x" (i.e., Jones – Period 2).

The naming convention is particularly important if you are using the Tutorial with several groups of students. So, for example, Mr. Robertson, who wants to use the Tutorial with students in three classes, will name his first class *Robertson – Period 2*. Subesquent classes might be named, *Robertson – Period 3*, and *Robertson – Period 4*.



A word about **State** and **Test Standards**:

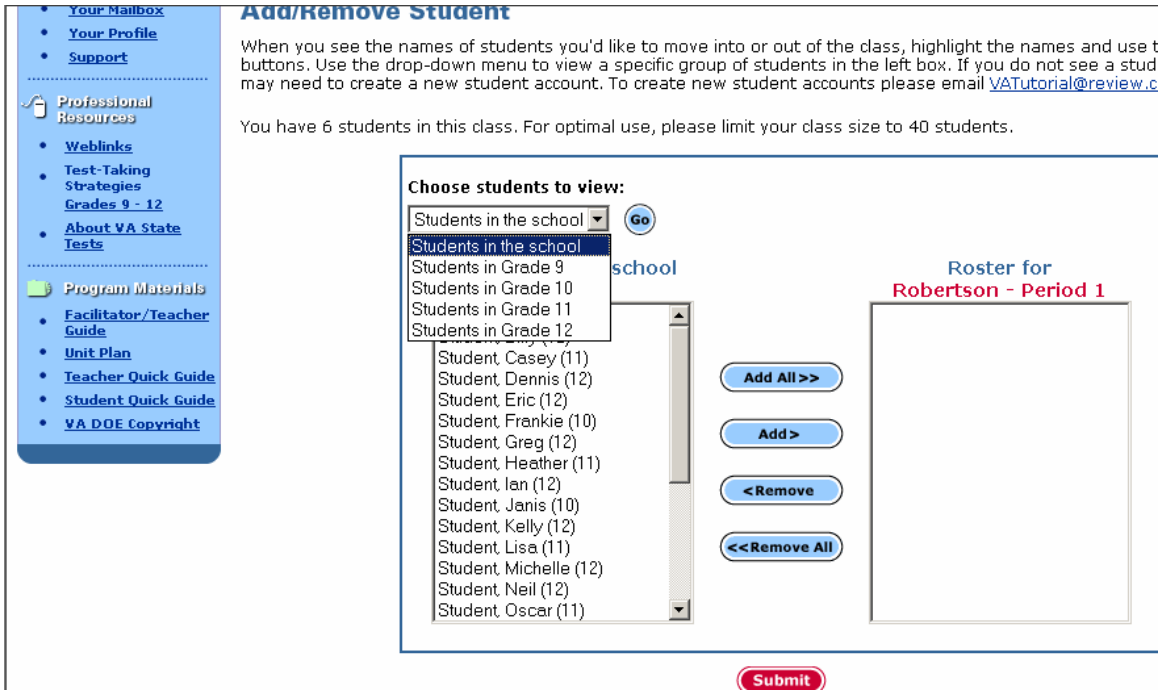
All of the content in the Tutorial is aligned to both the **Virginia SOL End of Course Algebra I Standards** and the **Virginia SOL End of Course Algebra I Test**. This means that all Tutorial items are written in the format and idiom of the actual SOL exam.

Achievement Levels:
VA DOE has set the bar high so that your students are well prepared for the SOL. A student must attain an 85% or above to be considered advanced, a 70% or above to be considered proficient. Any score below 70% means the student will be ill-prepared to take the SOL.

Once you have named your class, click **Next.** On the next page, you'll be asked to confirm your class name. If you need to change the name, click **Edit** to make any changes. Once you are satisfied with your class name, click **Confirm.**

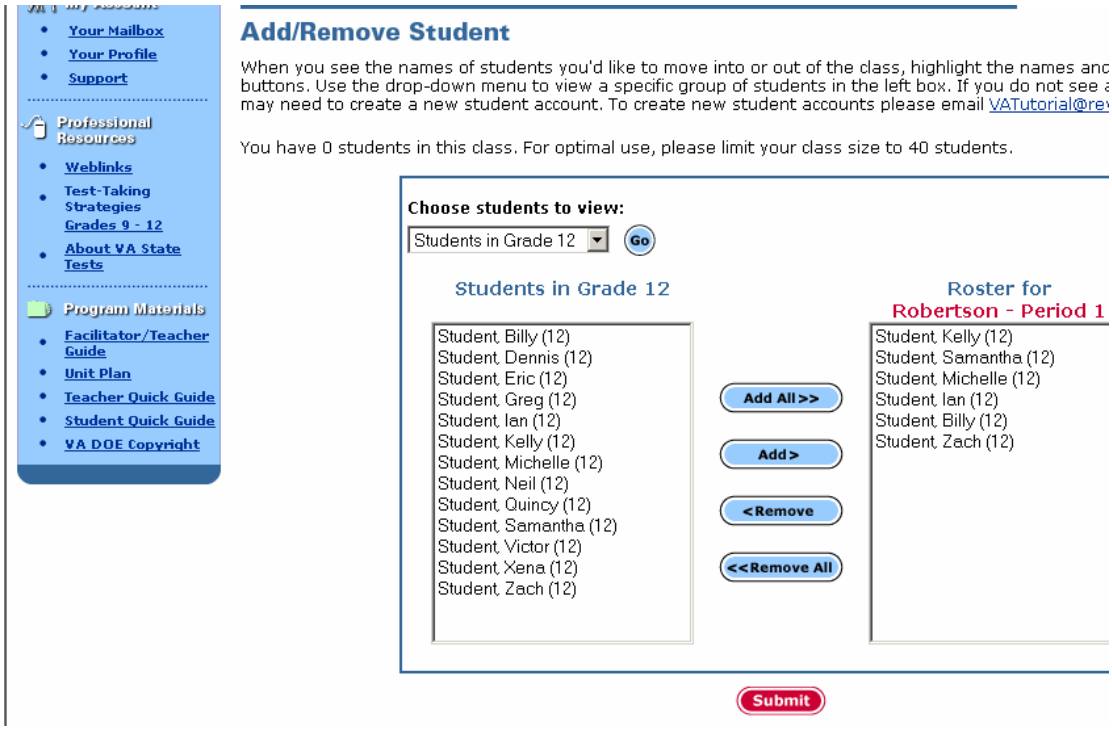
Now, it's time to **find your students**!!

All registered students in your school should appear in the left-hand box. Click on a student name to highlight that student and then use the **Add** button to move that student into your class (right box).

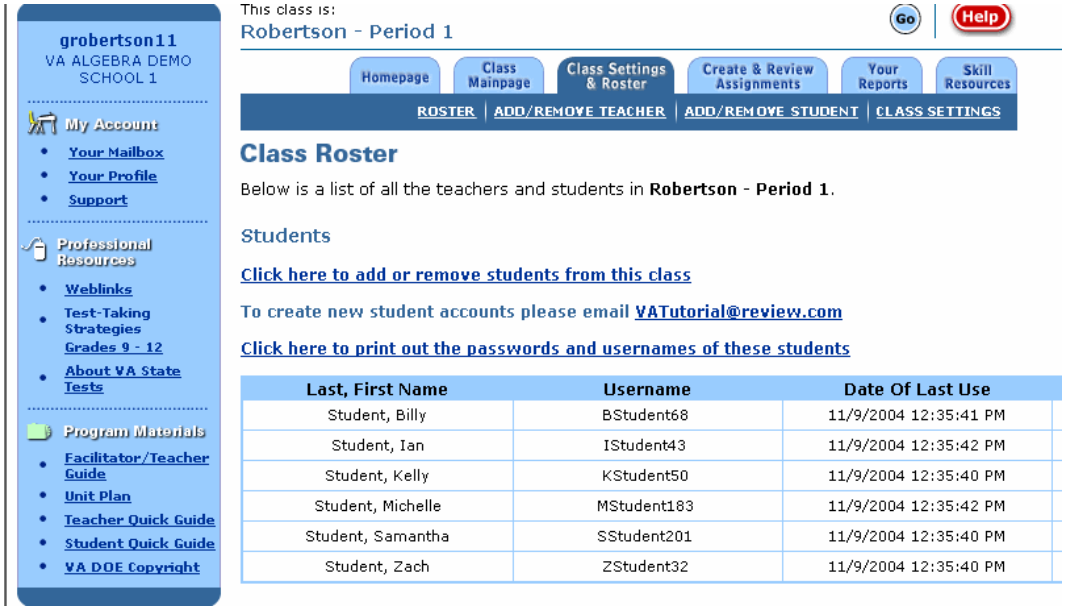


TIP: If your school has registered both juniors and seniors, and you are only working with seniors, use the drop down menu to find **Students in Grade 12**.

Once you have located all of your students, click **Submit.**



Congratulations! You have just created your first class. You should now see your students listed on the **Class Roster** page.



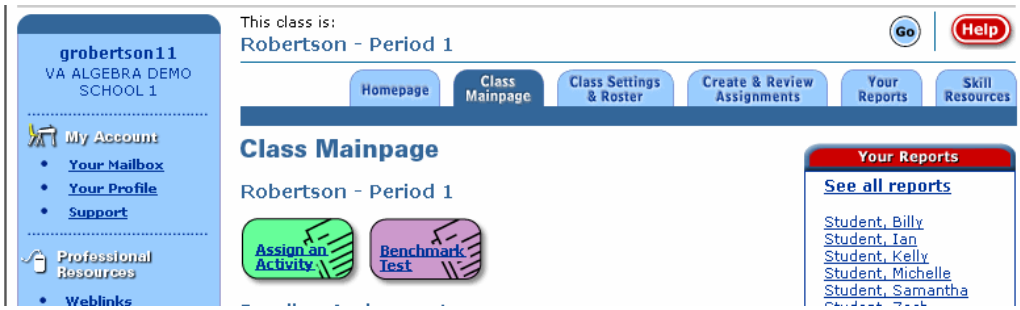
If you need to create additional classes, simply go back to your **Homepage** (look for the **Homepage** tab at the top of every page)**, Click here to create a new class** and go thru the class creation process again.

**Please note: if you do not see one of your students listed or you wish to add more students, please contact VATutorial@review.com.

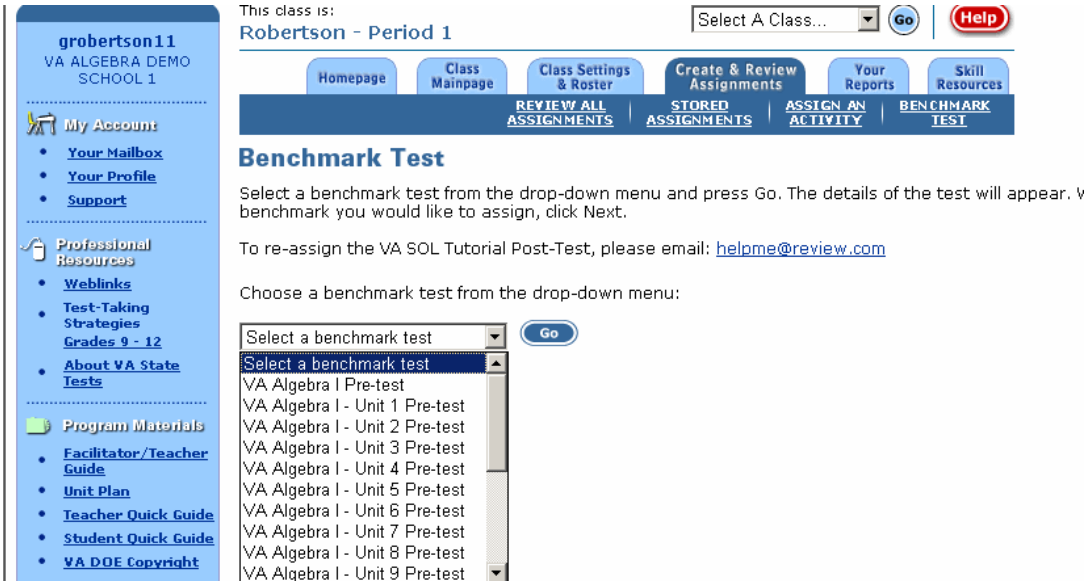
3. Facilitators: Assign the diagnostic pre-test

All students should begin the Tutorial by taking the full-length, diagnostic SOL Algebra practice test. This is the first step in determining where your students need additional help.

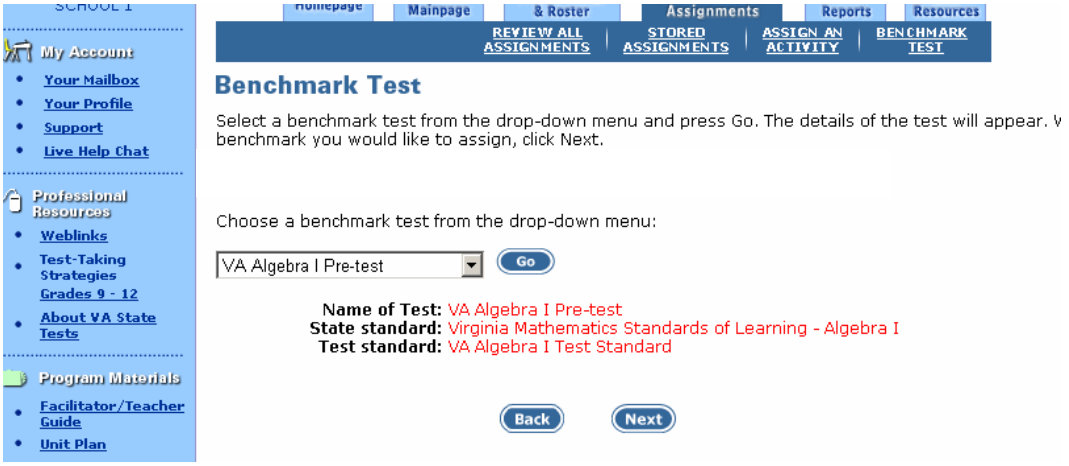
From your **Class Mainpage**, click on the **Benchmark Test icon**.



On the next page, click on the drop down menu to select the **VA Algebra I Pre-test.** Then click **Go.**

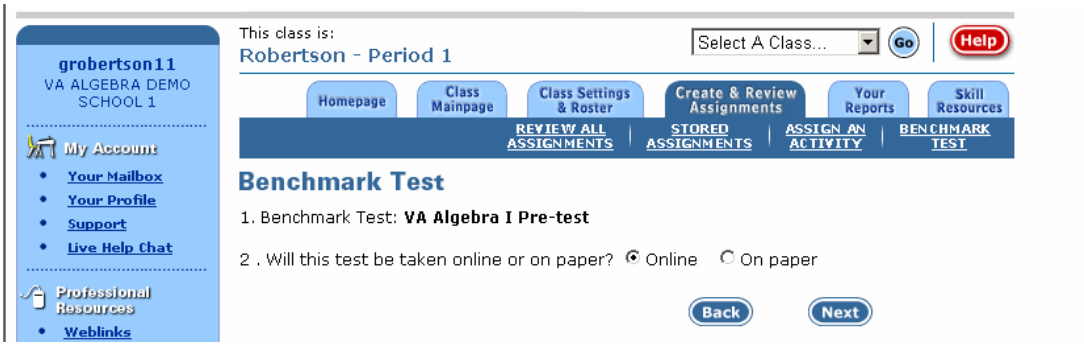


The page will reload with test details. Click **Next.**

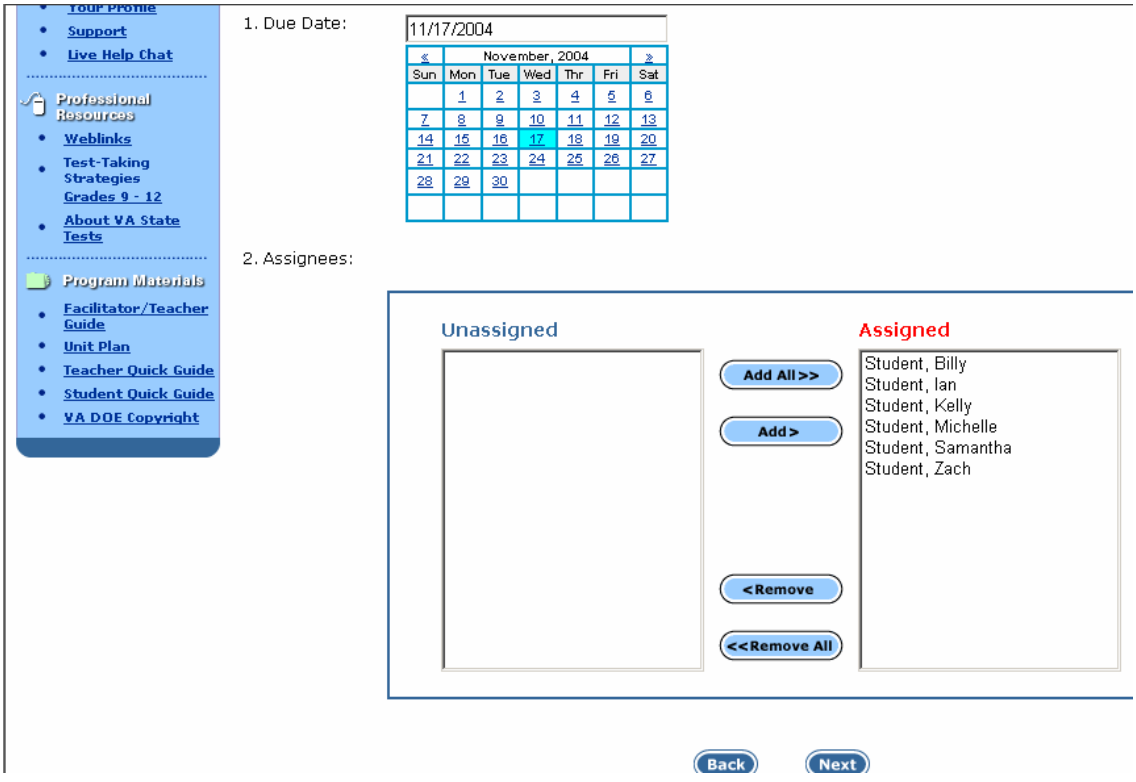


The test should be administered **online** in order to receive the most immediate results. If absolutely necessary, you may administer the test **on paper**, however, you or your students will still need to enter student answers online in order to access performance reports. Please see the Appendix for further offline test instructions.

Let's continue to assign this test online. Click **Next.**

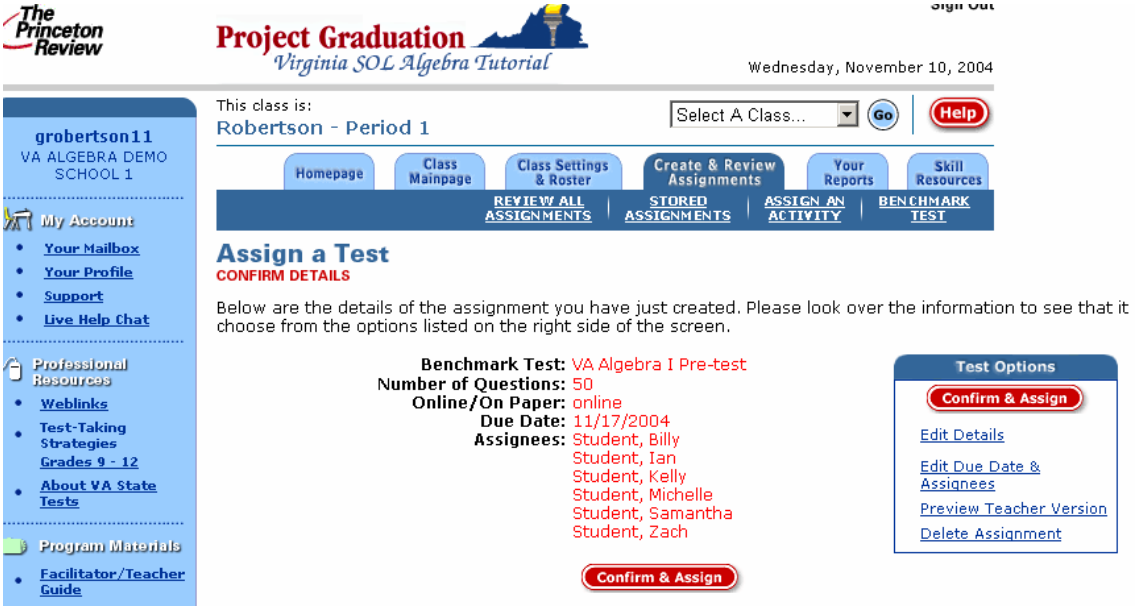


Choose a **due date** by clicking on the desired date in the calendar. Note: the default due date is one week from the date you assign the test.



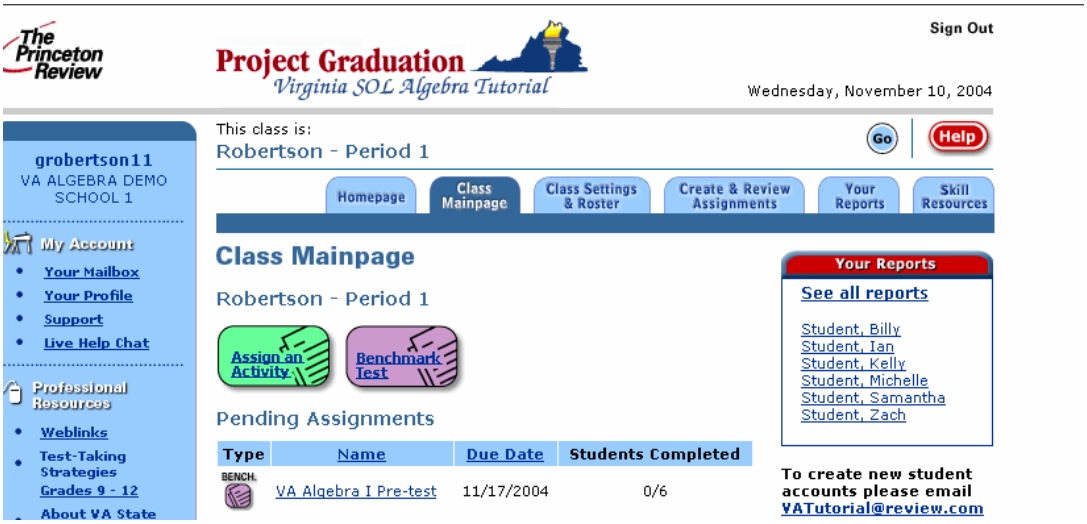
Make sure all of your students' names appear in the right box (**Assignees**). Click **Next**.

From the **Confirm Details** page, you will likely want to …



Click **Preview Teacher Version** to view the pre-test in its entirety. (Shhh…. This is your answer key!)

Most importantly, don't forget to **Confirm and Assign**. Once you have assigned the pre-test, it will appear on your **Class Mainpage**.

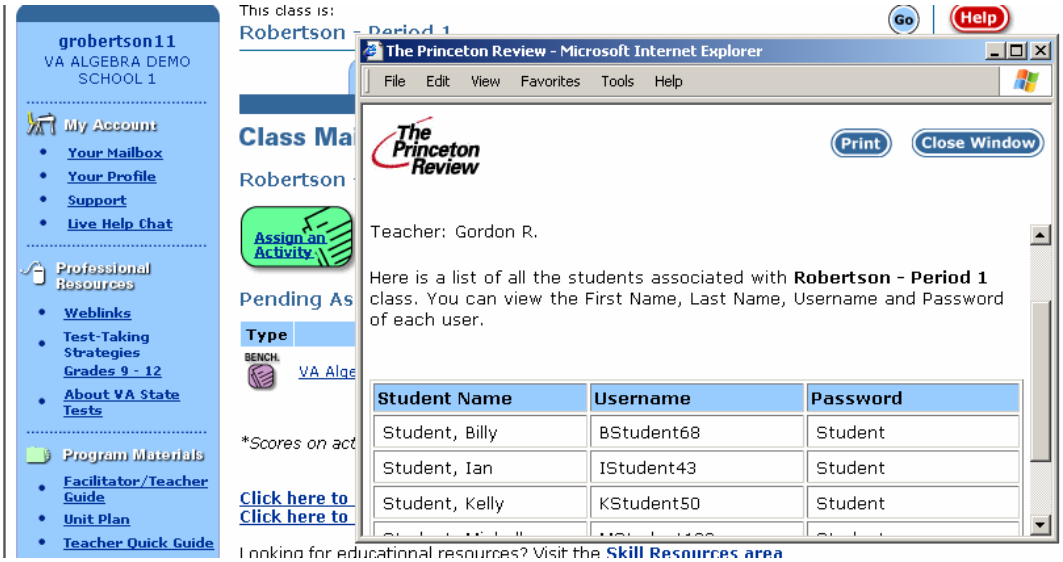


4. Facilitators: Prepare your students to take the pre-test

The results of the diagnostic pre-test are key in helping you to guide your instruction. We recommend that the pre-test is completed in one 90 minute sitting, simulating a test-like situation.

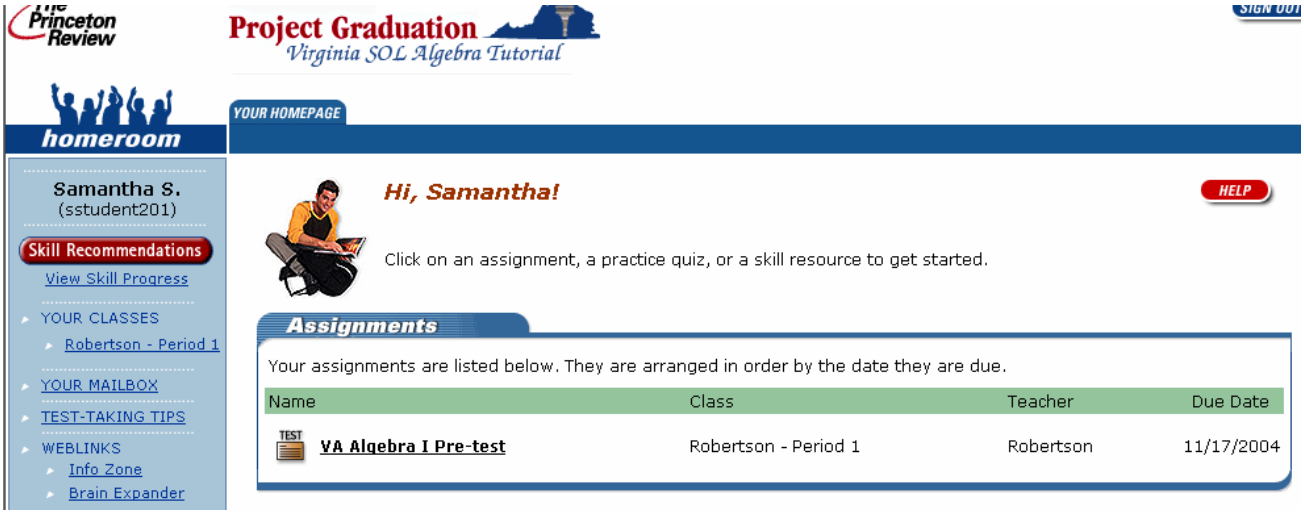
Before you hand out student usernames and passwords, make sure that all of your students' computers are set to the login page (www.ac.princetonreview.com). This will literally get everyone on the same page and allow for simultaneous login.

You'll find your students' usernames/passwords by clicking on **View/Print Usernames and Passwords** from your **Class Mainpage**.



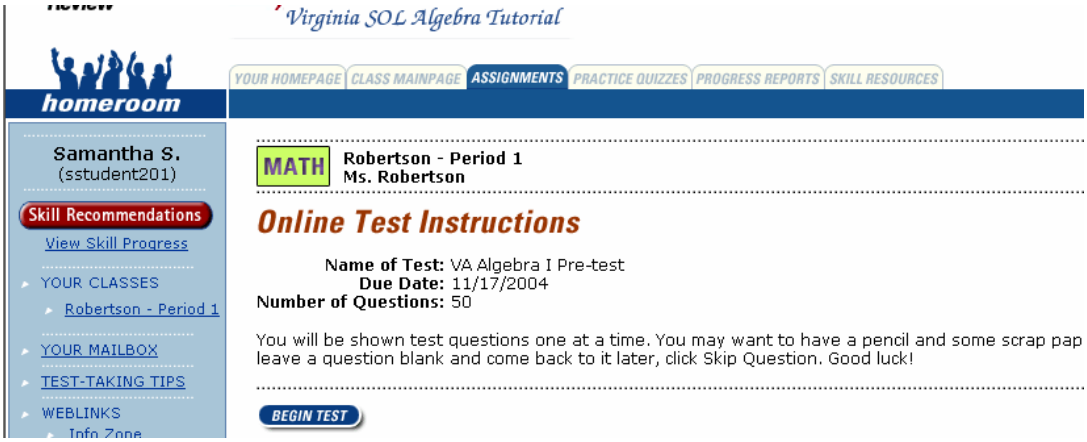
5. Students: Sign in and take the pre-test

Students will sign in to the Tutorial just as facilitators do, by going to www.ac.princetonreview.com entering in a **username** and **password** and clicking **Sign In.** Once the student signs in, she will arrive on her homepage.

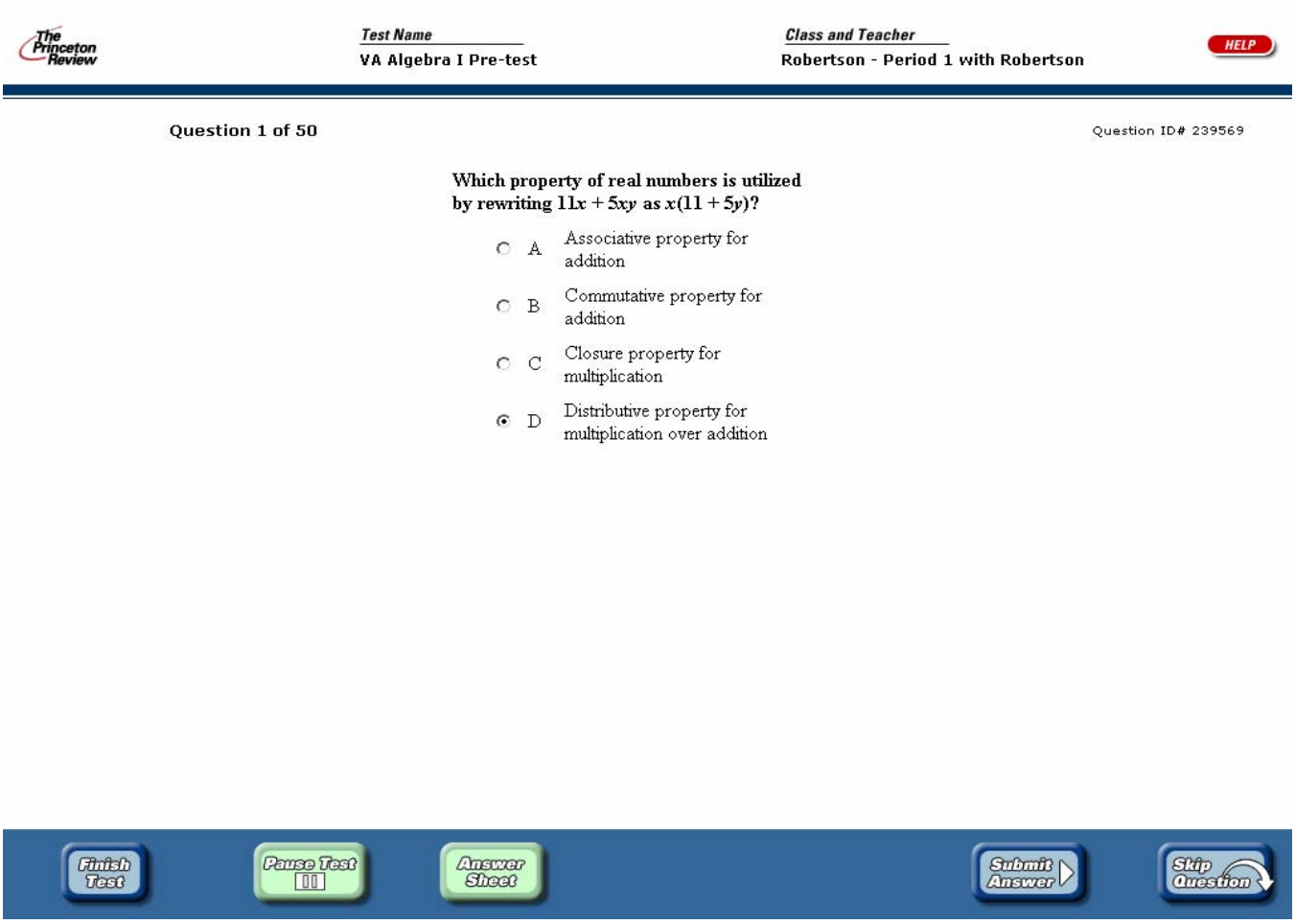


Instruct the student(s) to click on the test name.

On the next screen, the student should review the online test instructions. When she is ready, she should click **Begin Test**.

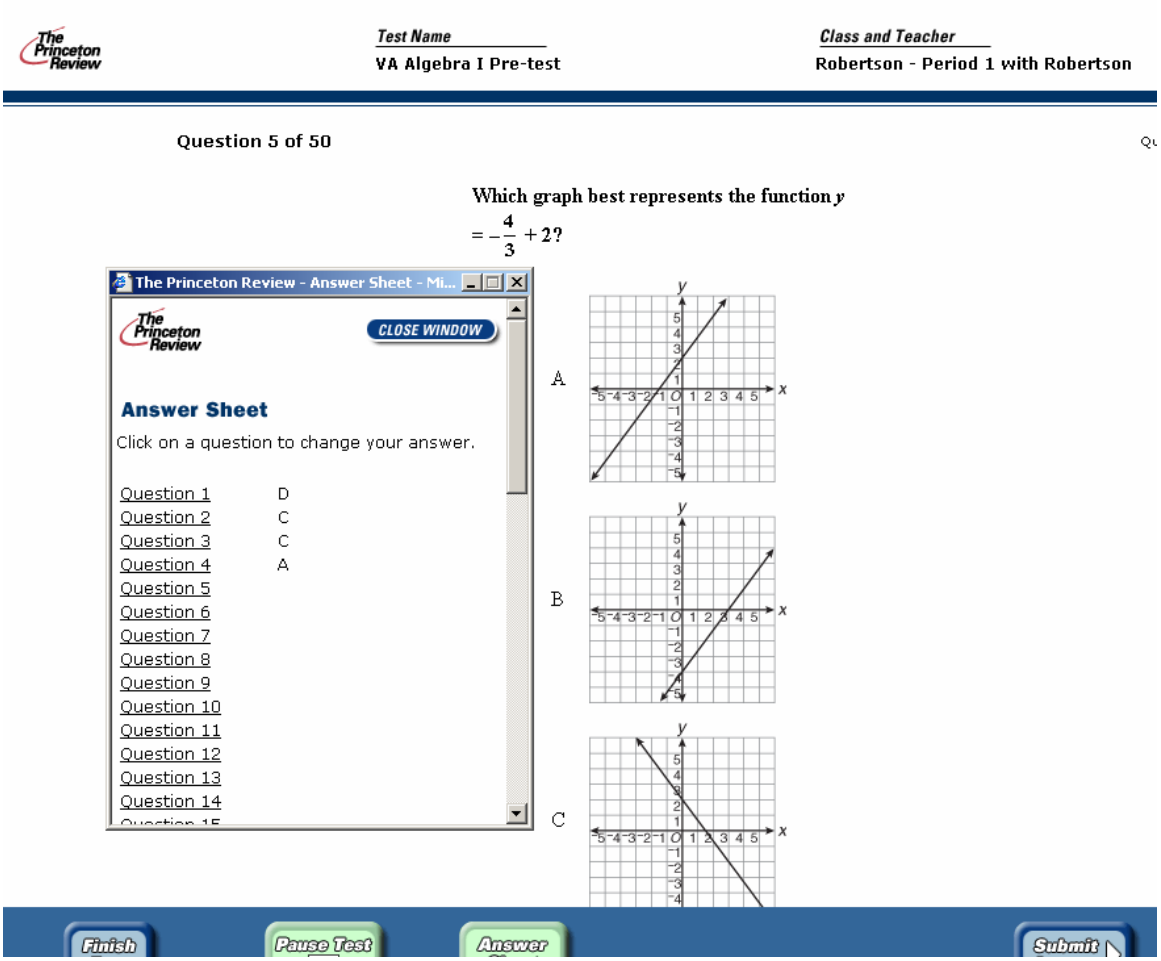


The test will appear full screen, one question at a time. The student should select an answer from the four choices presented and click **Submit** at the bottom of the screen.



If the student is unsure about a particular question, she may click **Skip Question** as she will later be able to return to the question.

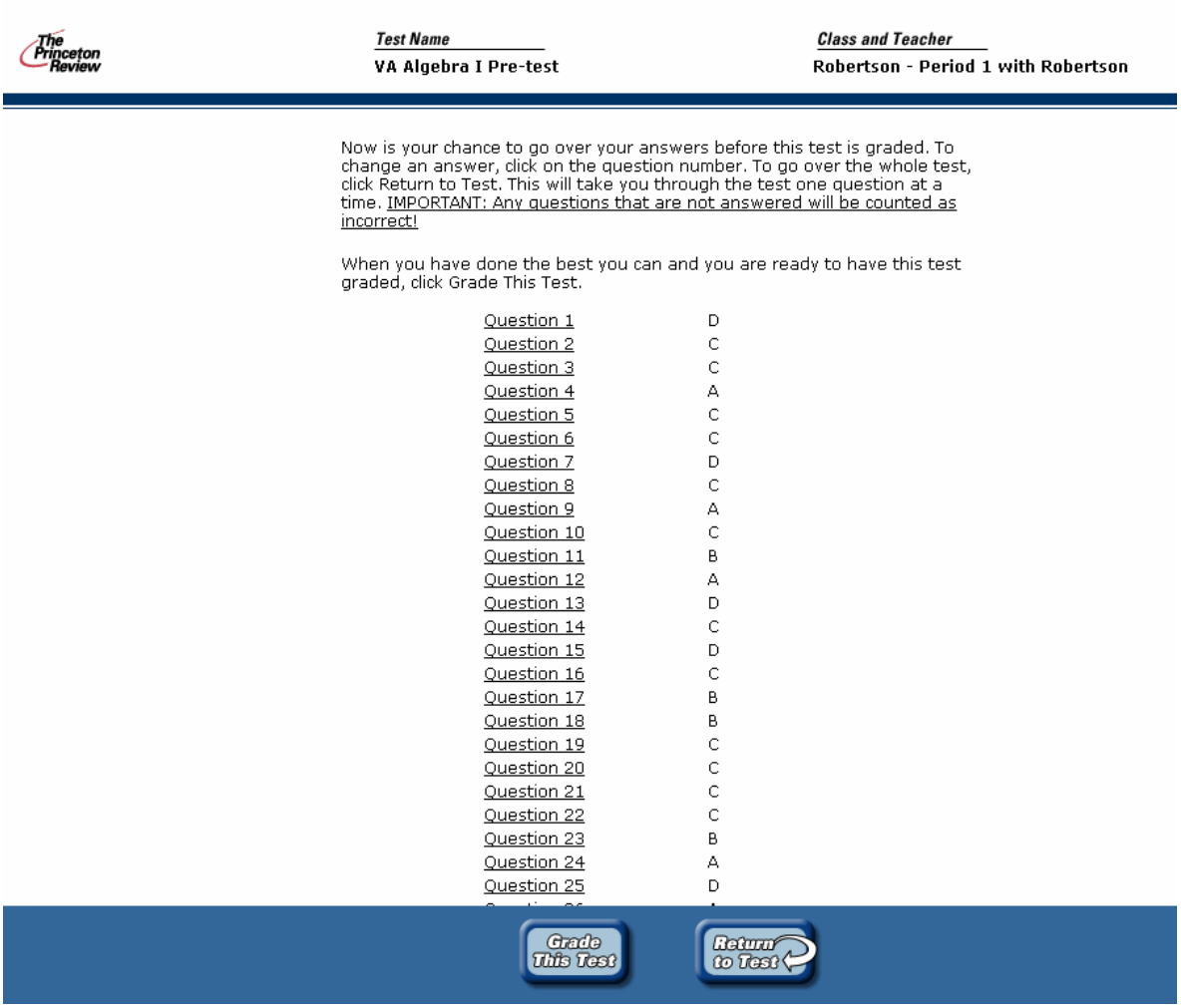
If the student wants to review her answers at any time, she may click on the **Answer Sheet** button. A pop-up window will appear with the student's answer choices up to this point. The student can change an answer simply by clicking on an individual question link.



The **Pause Test** button should only be used in cases when a student is unable to finish the test in the designated time period. When this button has been clicked, all answers chosen are saved in the system and the student may return to the test at a later date.

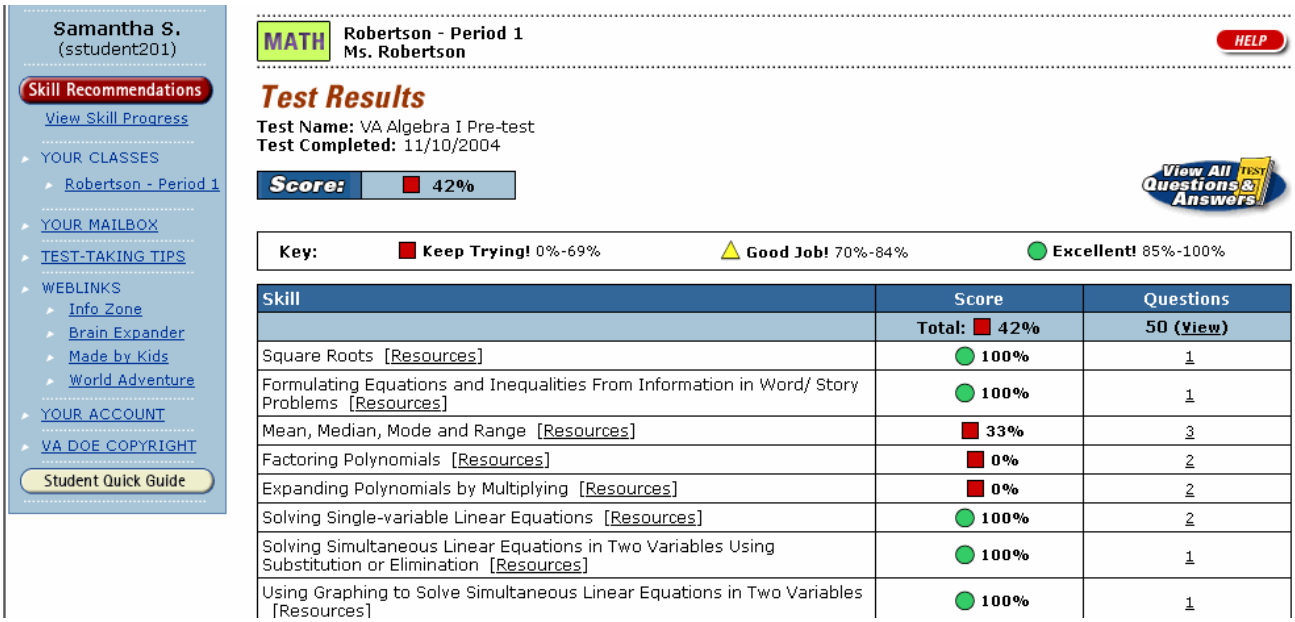
When the student has answered all questions on the pre-test, she will click **Finish Test**. On this screen, the student will have one more chance to review all answer choices and/or **Return to Test**.

When the student clicks **Grade this Test,** an hour glass will appear for a few seconds while the system grades the pre-test.

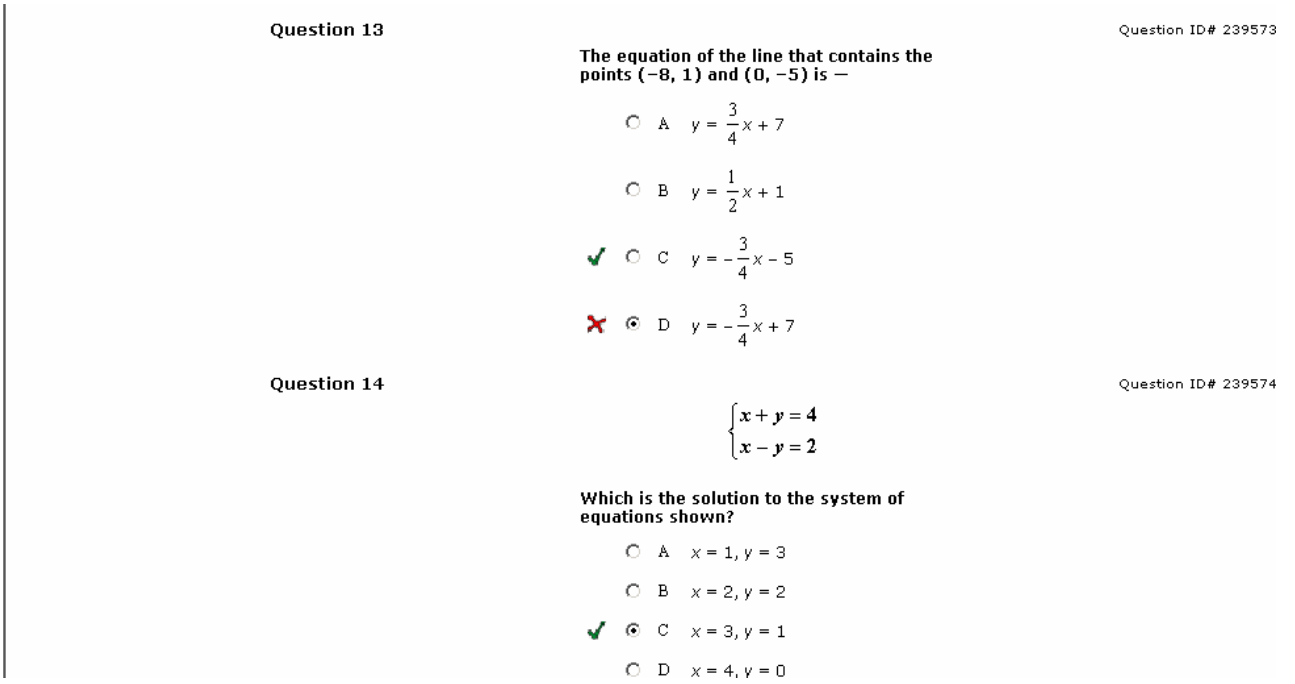


6. Students: View pre-test results

After the student has clicked **Grade This Test**, she will immediately be able to see how she did. The **Test Results** page will show the student her **overall score**, and the **individual score on each tested skill**.

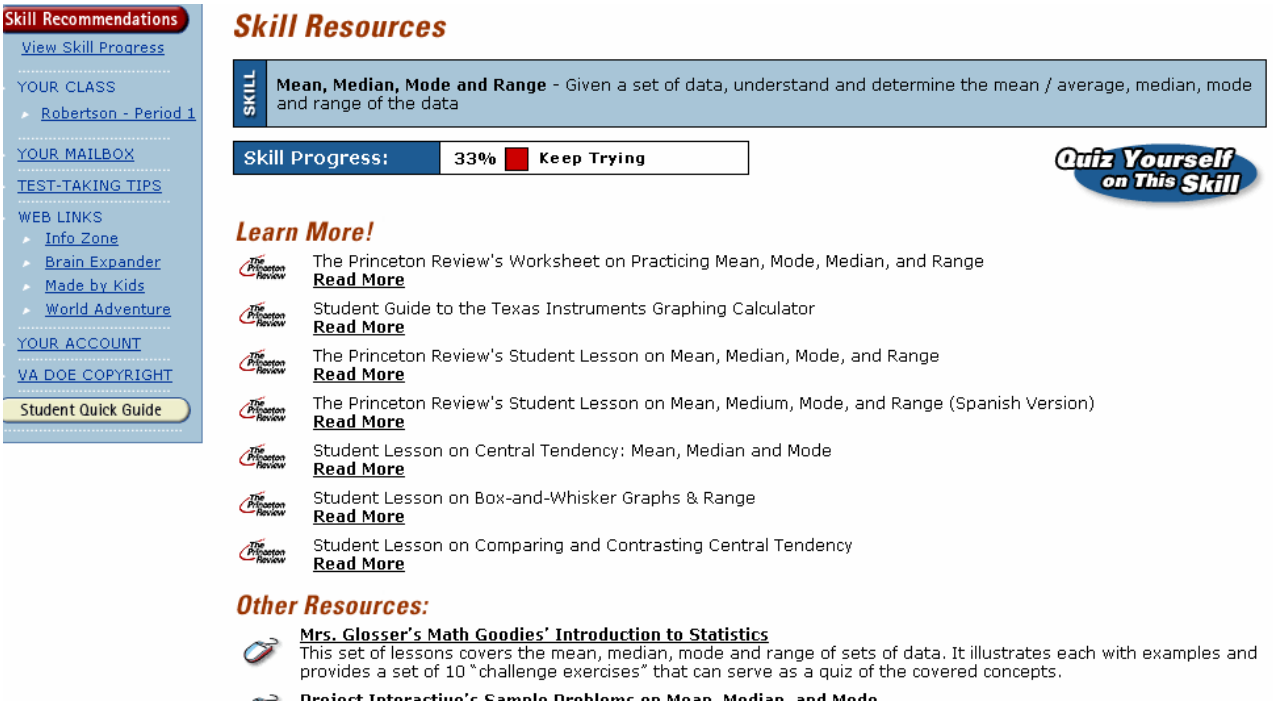


It is recommended that facilitators instruct students to review the pre-test by clicking on **View All Questions & Answers.** Here students will be able to view their responses as well as the correct response for each question.



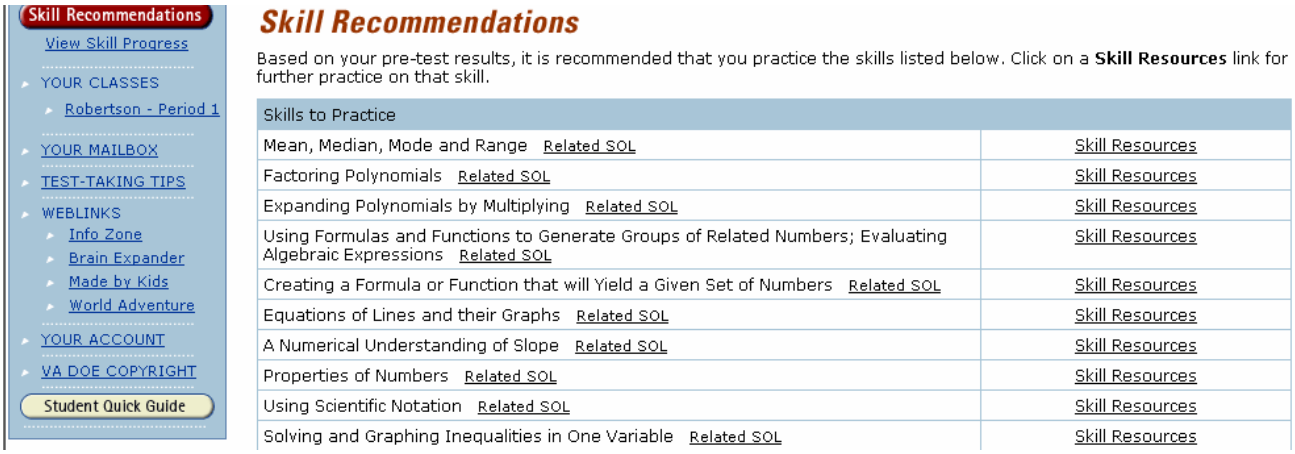
7. Students: Access resources / practice quizzes

Students may click on **Skill Helpers** and find a variety of remediation resources (i.e., worksheets, web activities).



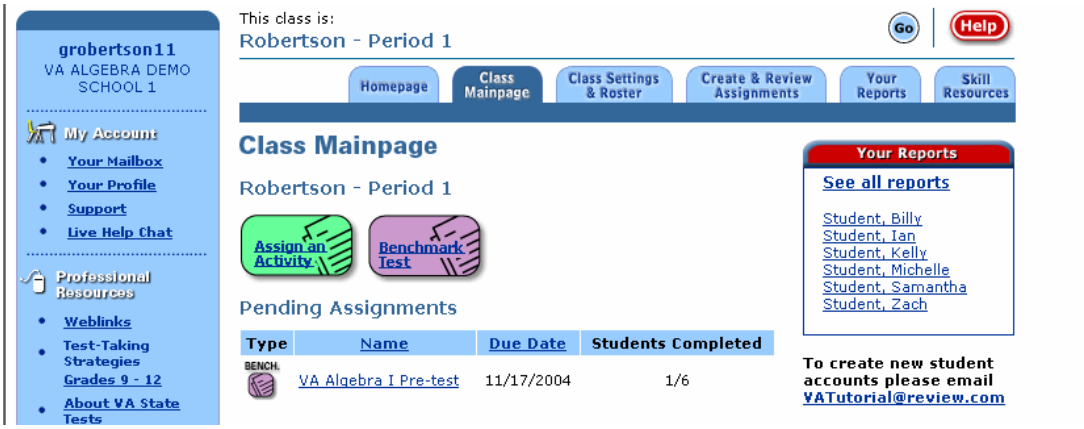
Students may also hone in on an individual skill by clicking **Quiz Yourself on This Skill** from any skill resources page. The practice quizzes are usually about five questions long and are visually presented in the same way as the pre-test / unit quizzes (full screen, one question at a time).

Students may also monitor their own progress by clicking the red **Skill Recommendations** button on the left nav. This page lists any skill for which the student has scored below 80%. When a student cumulatively achieves greater than 80% on any given skill (via unit tests and/or practice quizzes), the system will remove this skill from the Skill Recommendations page.

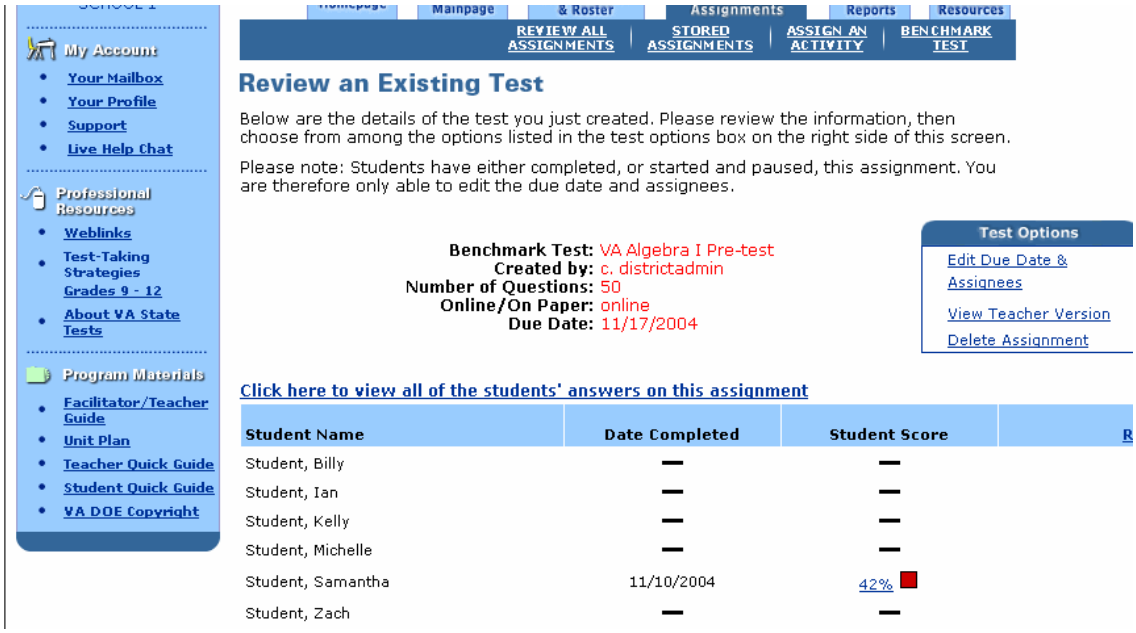


8. Facilitators: View individual student performance on the pre-test

Once your students have taken the pre-test, you'll immediately be able to see how they fared. After signing in to your teacher account, click on the name of your class. From your **Class Mainpage,** click on **VA Algebra I Pre-test**.



From the **Review an Existing Test** page, you will see each student's overall score. For those students who have been *assigned* but have not yet *taken* the pre-test, a dash "----" will appear in both the **Date Completed** and **Student Score** columns.



In order to view an **individual student's performance** on the pre-test, click on her score. This skill-based report will help you determine which skills she should focus on.

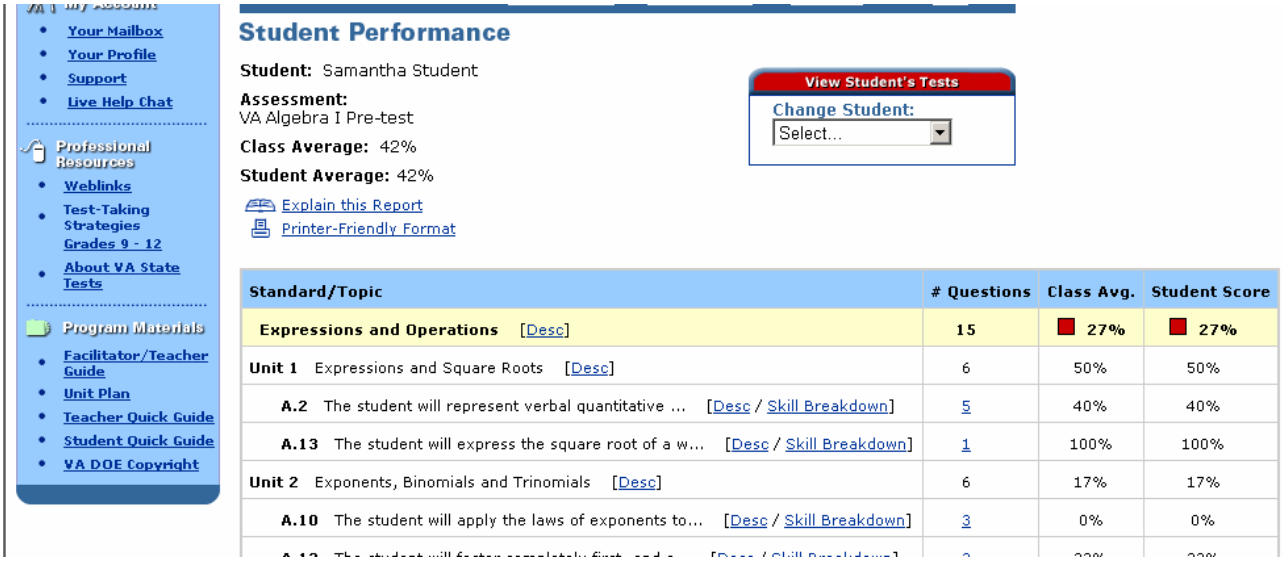
Note that the reports are structured as follows:

Reporting Category (*Expressions and Operations...*)

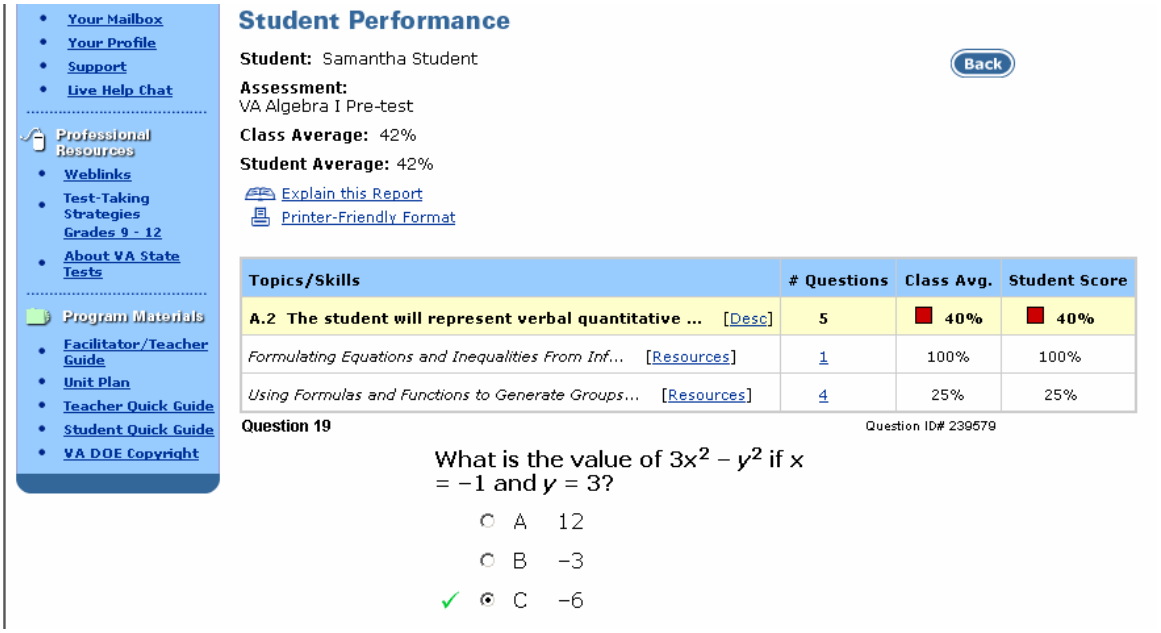
Unit (*Unit 1 Expressions and Square Roots…*)

SOL *(A.2 The student will represent verbal quantitative situations algebraically …)*

Skill(s)* (*Formulating Equations and Inequalities From Information in Word / Story Problems…*)



*In order to view the skill that relates to a particular SOL, click on **Skill Breakdown**. In the example below, Samantha has scored a 25% on the 4 questions aligned to *Using Formulas and Functions to Generate Groups*. This page allows you to review each of those questions as well as Samantha's answer choices.



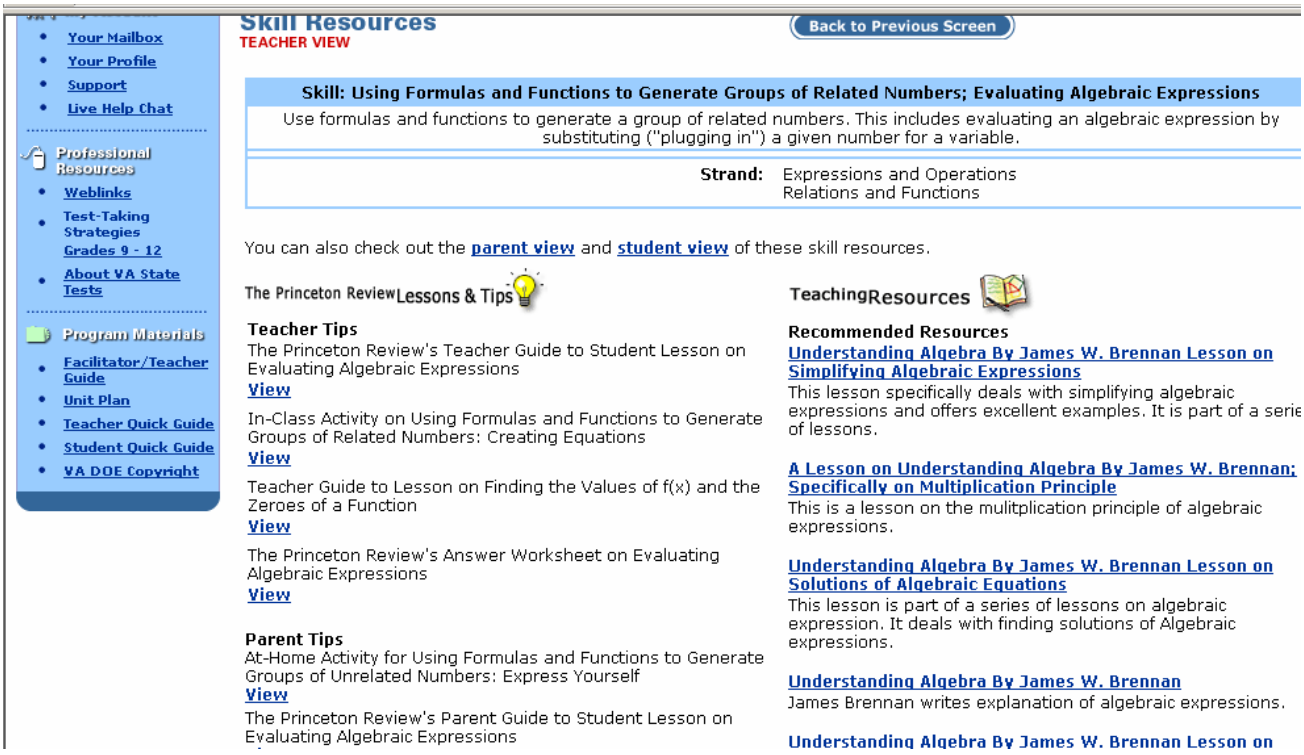
Naturally, you'd want Samantha to brush up on formulas and functions, since she doesn't appear to have a good grasp of the concept. By clicking on **Resources**, next to the skill name, you will have a variety of resources to choose from….

9. Facilitators: Assign Resources

Remember that each skill tested on the SOL has its own dedicated resource page.

Teacher Tips are short activities that are directed to a variety of learning styles. Some require common classroom supplies, others require manipulatives. These mini-lessons can be used with the entire class or with small groups of students.

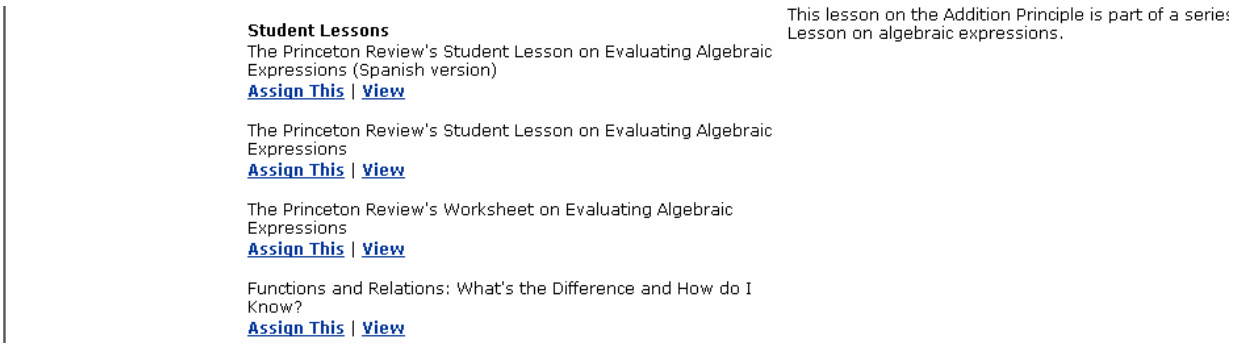
Web links connect to hand-picked educational sites with grade-appropriate lesson plans, worksheets, question-and-answer pages, and projects.



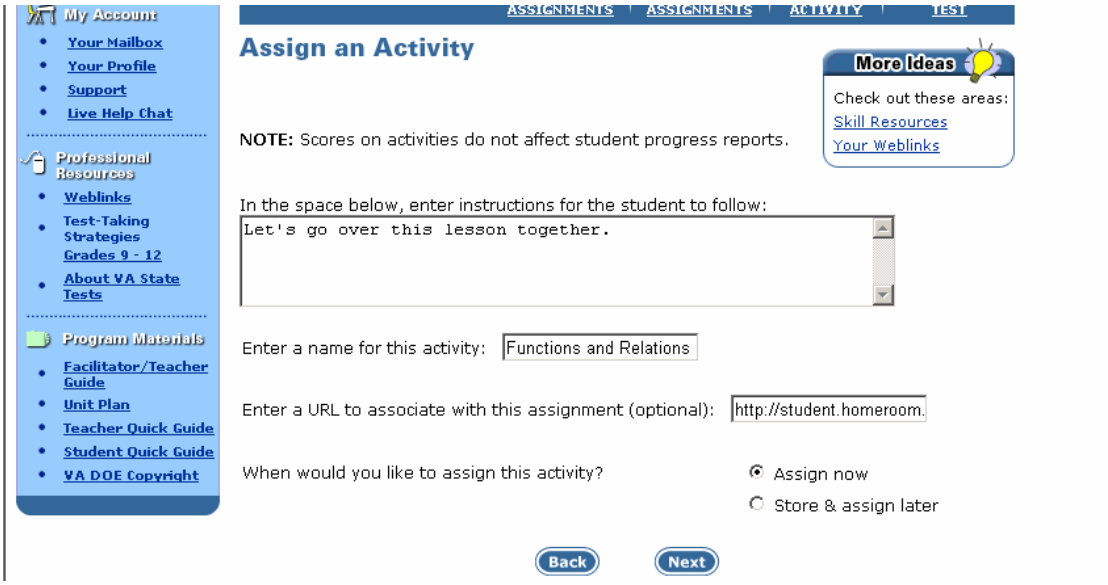
From a Skill Resource page, you can easily assign **Student Lessons**. Review the lesson or worksheet first by clicking on **View Lesson**.

When you have reviewed the lesson and have determined that it is appropriate for your student(s), click **Close** to get back to the skill resource page.

Click the **Assign This** link, under the chosen lesson.



The next screen will ask you to **type in some instructions** for your student and **enter in a name for the activity**.

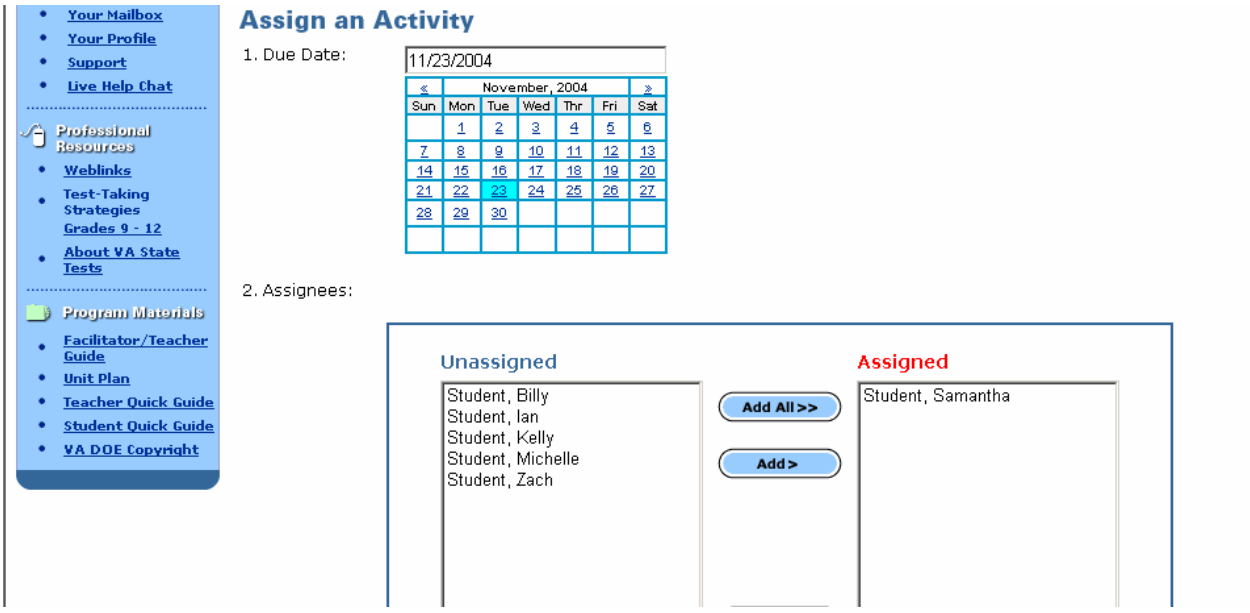


Please note that all Princeton Review Lessons will have a corresponding **url** (web address). No need to change anything here!

You will most likely want to **assign the worksheet or lesson right away.** You may also **store it for later.**

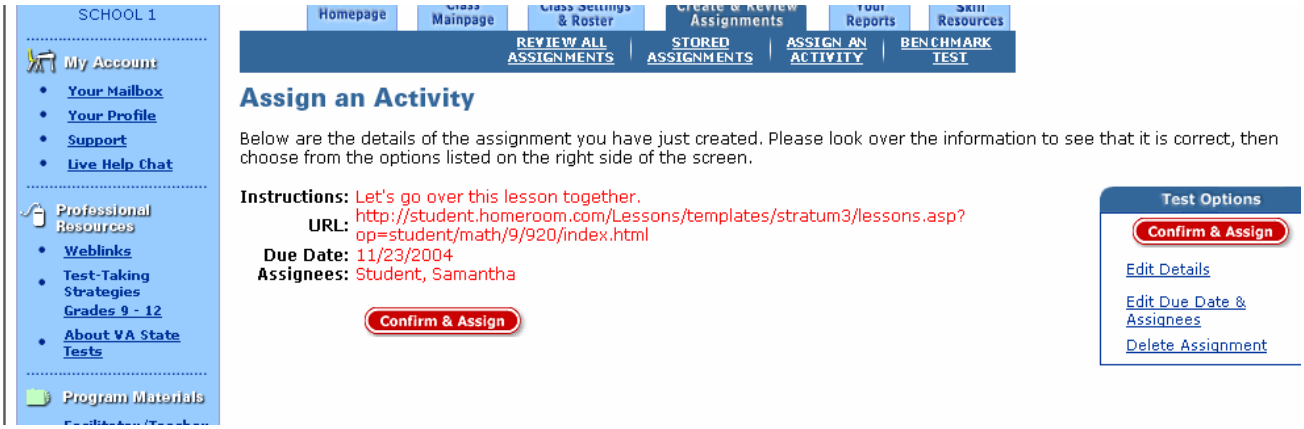
Click **Next.**

You've seen this next screen before…



Select a **due date**. Decide **which student(s) should complete the assignment**. Click **Next**.

Be sure to **Confirm & Assign** the activity on the next page and you're done! When your students next log in, they'll know they have an assignment to complete.



10. Facilitators: Re-assess, Re-analyze, Re-teach (aka: Wash, Rinse, Repeat…)

After you have re-taught key concepts, you'll naturally want to re-assess student mastery of these concepts. After you have done the first round of **assess** (pre-test), **analyze** (view test results) and **re-teach** (assign resources), you'll likely want to assign one of the unit pre-tests which covers the skill(s) you just covered with your student(s).

Let's look at Samantha again. Remember that she needed a lot of help understanding the concept of **functions and relations**. By looking at the Tutorial Unit Plan (see Appendix) Mr. Robertson knows that functions and relations is covered in **Unit 1**. After going over the functions and relations lesson with Samantha, Mr. Robertson assigns the **Unit 1 Pre-test**.

You can assign unit tests in the same way you assigned the full-length pre-test, by clicking on the **Benchmark Test** icon from your **Class Mainpage**. Choose the appropriate unit pre/post test, choose a due date, assign the test to the appropriate student(s), and you're all set!

After your student(s) take a test, you should again examine individual test performance. You can also start to look at **overall skill performance** for each student as you accumulate more data.

TIP: The **skill based results** and **question details** (item analysis) reports for an individual assignment are particularly helpful if you are able to work with your students as a group. These reports will enable you to determine if your students truly aren't understanding a concept or if certain questions are just plain tricky!!

Help and Information

For technical assistance:

- Call The Princeton Review Customer Support Hotline – 1-800-778-7737
- Email The Princeton Review at helpme@review.com
- Access Live Chat from your facilitator account: 12-3pm, Mon – Fri

For questions regarding eligibility and additional training:

- Contact Deborah Bliss, Secondary Mathematics Specialist, Virginia Department of Education (804-786-6418, Deborah.Bliss@doe.virginia.gov)

For general questions regarding the Tutorial:

- Contact Renee Vogel, Account Manager, The Princeton Review (1-800-738-4392, x 1237, reneev@review.com)

Appendix

Virginia SOL Algebra Tutorial Unit Plan

The Algebra Tutorial is divided into nine instructional units. Please review the unit breakdown below for SOL / skill alignment.

*Please note that a skill may be aligned with more than one SOL (i.e., in Unit 4, *Solving and Graphing Inequalities in One Variable* is aligned to both A.1 and A.3).

REPORTING CATEGORY: Expressions and Operations

Unit 1: Expressions and Square Roots

A.2 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.

- Formulating Equations and Inequalities From Information in Word/ Story Problems
- Assigning Variables to Solve Word/Story Problems
- Using Formulas and Functions to Generate Groups of Related Numbers; Evaluating Algebraic Expressions

A.13 The student will express the square root of a whole number in simplest radical form and approximate square roots to the nearest tenth.

- Square Roots
- Calculating Square Roots of Fractions and Decimals.

Unit 2: Exponents, Binomials, and Trinomials

A.10 The student will apply the laws of exponents to perform operations on expressions with integral exponents, using scientific notation when appropriate.

- Multiplying Whole Numbers Using Exponents
- Using Scientific Notation
- Multiplying and Dividing Monomials Using Properties of Exponents

A.12 The student will factor completely first- and second-degree binomials and trinomials in one or two variables. The graphing calculator will be used as a tool for factoring and for confirming algebraic factorizations.

- Factoring Polynomials
- Factoring Polynomials Whose Terms have a Common Monomial Factor

Unit 3: Polynomials

A.11 The student will add, subtract and multiply polynomials and divide polynomials with monomial divisors, using concrete objects, pictorial and area representations and algebraic manipulations.

- Expanding Polynomials by Multiplying
- Adding and Subtracting Polynomials
- Using Negative and Zero Exponents to Simplify Monomial and Numerical Expressions
- Dividing Polynomials by Monomials

REPORTING CATEGORY: Equations and Inequalities

Unit 4: Linear Equations and Inequalities

A.1 The student will solve multistep linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions.

- Solving Single-variable Linear Equations
- Solving and Graphing Inequalities in One Variable
- Dividing Polynomials by Monomials
- Literal Equations

A.3 The student will justify steps used in simplifying expressions and solving equations and inequalities. Justifications will include the use of concrete objects; pictorial representations and the properties of real numbers, equality and inequality.

- Solving Single-variable Linear Equations
- Properties of Numbers
- Solving and Graphing Inequalities in One Variable

Unit 5: Equations and Graphs

A.6 The student will select, justify and apply an appropriate technique to graph linear functions and linear inequalities in two variables. Techniques will include slope-intercept, x- and y-intercepts, graphing by transformation and the use of the graphing calculator.

- Equations of Lines and their Graphs
- Using the Graph to Determine the Equation of a Line
- Solving and Graphing Linear Inequalities in Two Variables
- Finding the x-intercept(s) and/or y-intercept(s) of a Function

A.7 The student will determine the slope of a line when given an equation of the line, the graph of the line or two points on the line. Slope will be described as rate of change and will be positive, negative, zero or undefined. The graphing calculator will be used to investigate the effect of changes in the slope on the graph of the line.

- What is Slope?
- A Numerical Understanding of Slope

A.8 The student will write an equation of a line when given the graph of the line, two points on the line or the slope and a point on the line.

- Constructing Lines - Plotting Points Using an Equation
- Using Slope and Y-intercept to Construct Lines on the XY Plane
- Using the Graph to Determine the Equation of a Line
- Number Puzzles - Finding the Missing Pieces
- Writing the Equation of a Line, Given the Slope and y-intercept
- Writing the Equation of a Line, Given the Slope and One Point
- Writing the Equation of a Line, Given the Coordinates of Two Points
- Understanding the Standard Form of a Linear Equation

Unit 6: Systems of Equations and Quadratic Equations

A.9 The student will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. Graphing calculators will be used both as a primary tool for solution and to confirm an algebraic solution.

- Solving Simultaneous Linear Equations in Two Variables Using Substitution or Elimination
- Using Graphing to Solve Simultaneous Linear Equations in Two Variables

A.14 The student will solve quadratic equations in one variable both algebraically and graphically. Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.

- Solving Quadratic Equations by Factoring
- Graphing Quadratic Equations / Functions

REPORTING CATEGORY: Relations and Functions

Unit 7: Relations, Functions, Domain and Range

A.5 The student will create and use tabular, symbolic, graphical, verbal, and physical representations to analyze a given set of data for the existence of a pattern, determine the domain and range of relations, and identify the relations that are functions.

- Creating a Formula or Function that will Yield a Given Set of Numbers
- Using the Graph to Determine the Equation of a Line
- Understanding Functions
- Range and Domain

Unit 8: Values and Zeroes of Functions, Variation

A.15 The student will, given a rule, find the values of a function for elements in its domain and locate the zeros of the function both algebraically and with a graphing calculator. The value of f(x) will be related to the ordinate on the graph.

- Using Formulas and Functions to Generate Groups of Related Numbers; Evaluating Algebraic Expressions
- Understanding Functions
- Range and Domain

A.18 The student will analyze a relation to determine whether a direct variation exists and represent it algebraically and graphically, if possible.

- Direct, Inverse and Joint Variation

REPORTING CATEGORY: Statistics

Unit 9: Statistics

A.4 The student will use matrices to organize and manipulate data, including matrix addition, subtraction and scalar multiplication. Data will arise from business, industrial and consumer situations.

- Adding and Subtracting Matrices
- Organize and Display Data Using Matrices
- Scalar Products

A.16 The student will, given a set of data points, write an equation for a line of best fit and use the equation to make predictions.

- Determining the Line of Best Fit

A.17 The student will compare and contrast multiple one-variable data sets, using statistical techniques that include measures of central tendency, range and box-and-whisker graphs.

- Organizing Data into Graphs and Pictures
- Reading Graphs and Charts
- Mean, Median, Mode and Range
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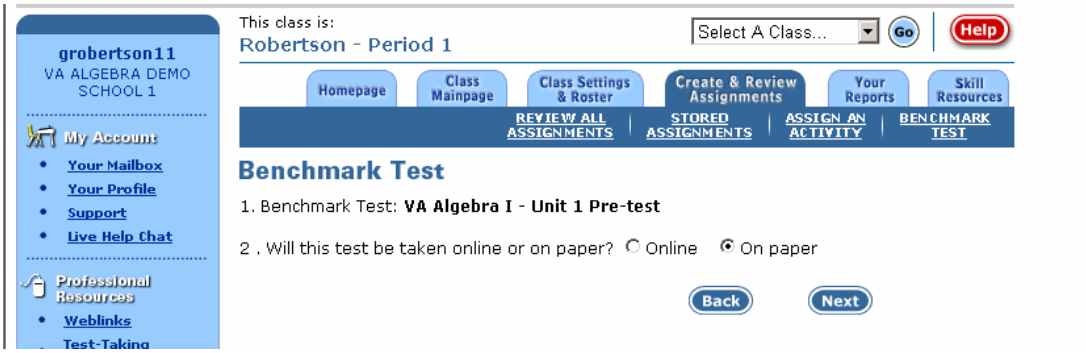
On paper test administration

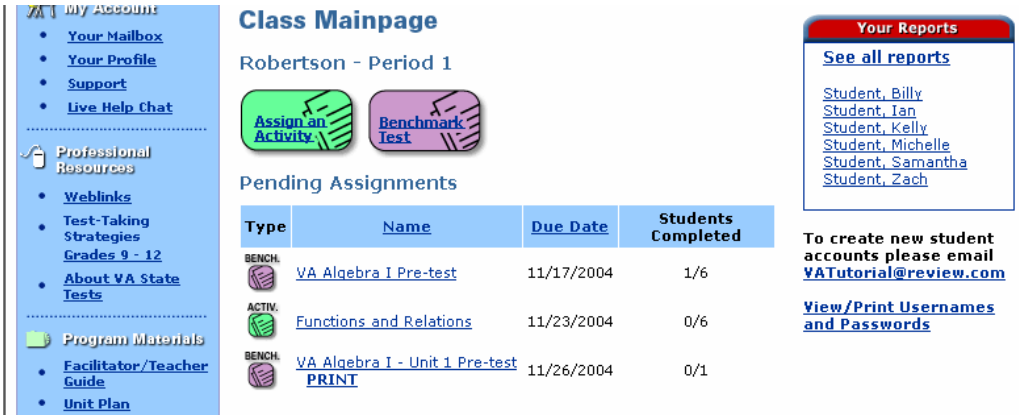
If you have limited access to technology and need to administer tests on paper, please read the following:

As you go thru the process of assigning a unit test, make sure you select **On paper** instead of **Online** when you come to the screen below. Then, click **Next**.



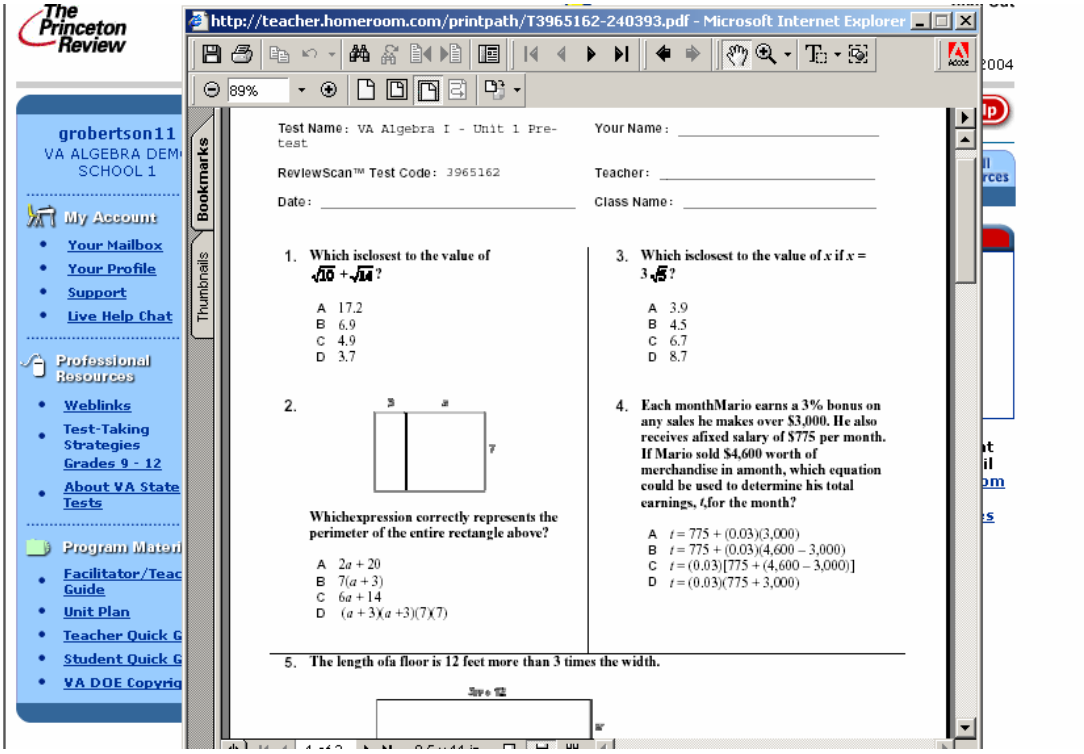
On the next page, select the due date and assign the test to the appropriate student(s). After you click **Confirm and Assign**, you'll return to your class mainpage. Note that a new **PRINT** link appears. This is where you'll find the pdf* student version of the test.

*You must have Adobe Acrobat Reader installed on your computer in order to print the student version.



Click **PRINT**.

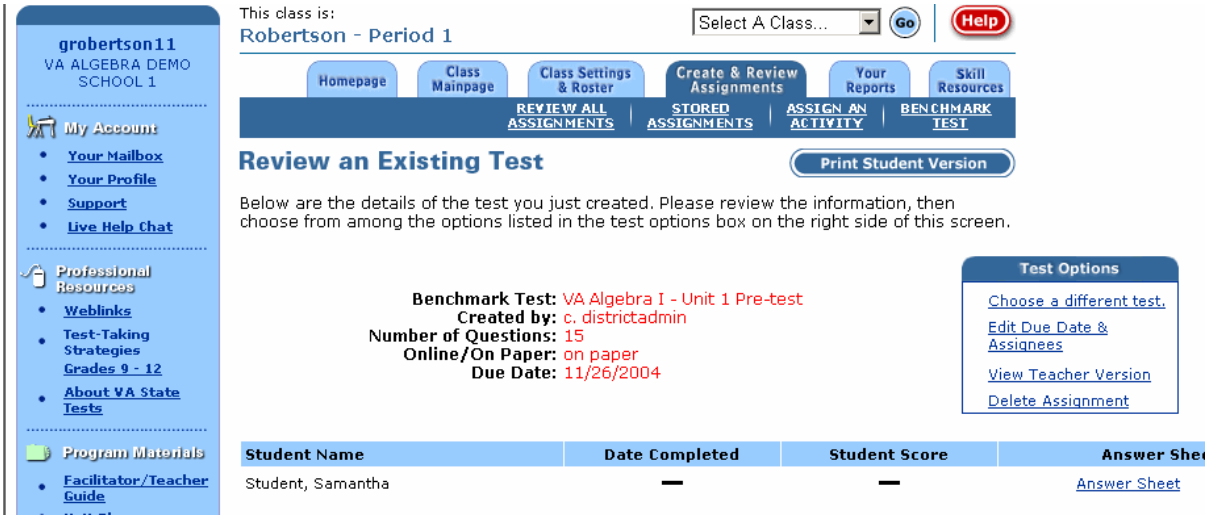
Another window will open, and you'll be able to print the student version by clicking on the printer icon at the top of that window. Close that window by clicking on the "x" at the top right hand corner and you'll return to your class mainpage.



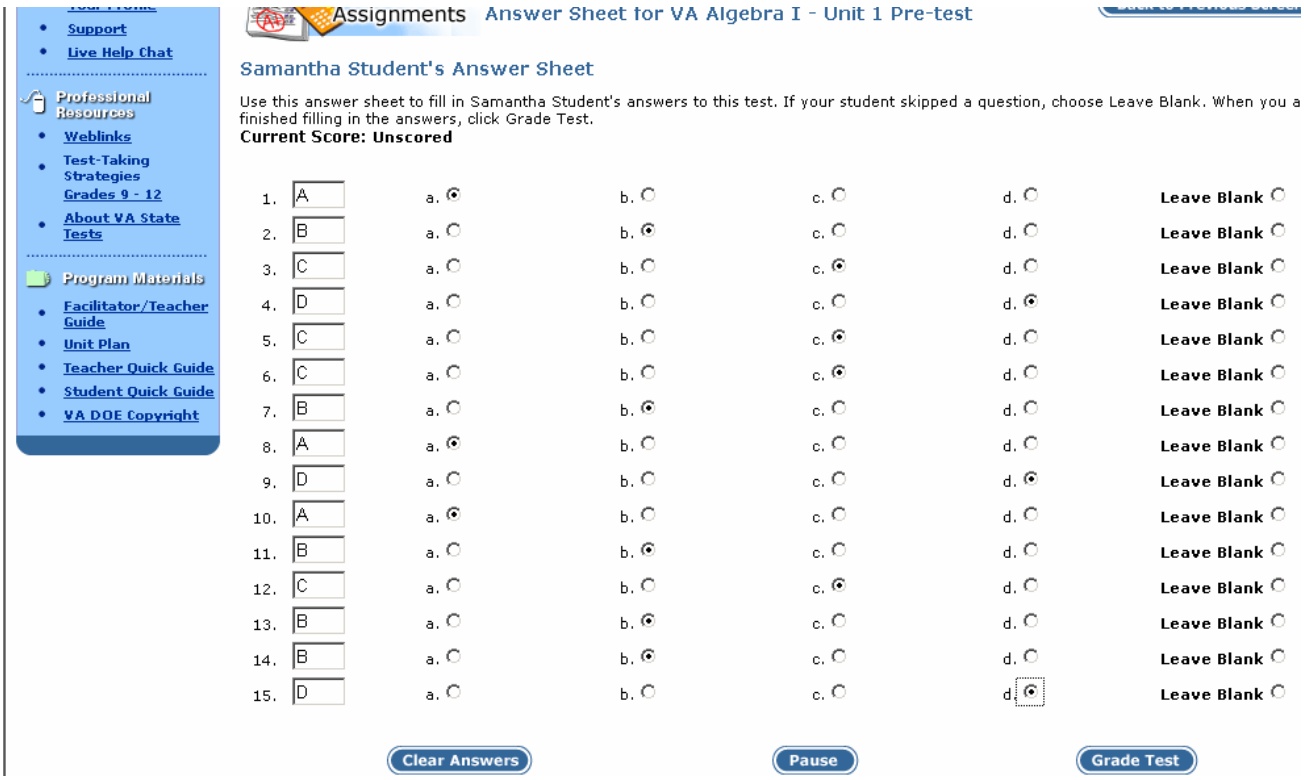
After students have taken the test, either the facilitator or the student must enter student responses into the system.

Option 1: Facilitator/Teacher enters student responses

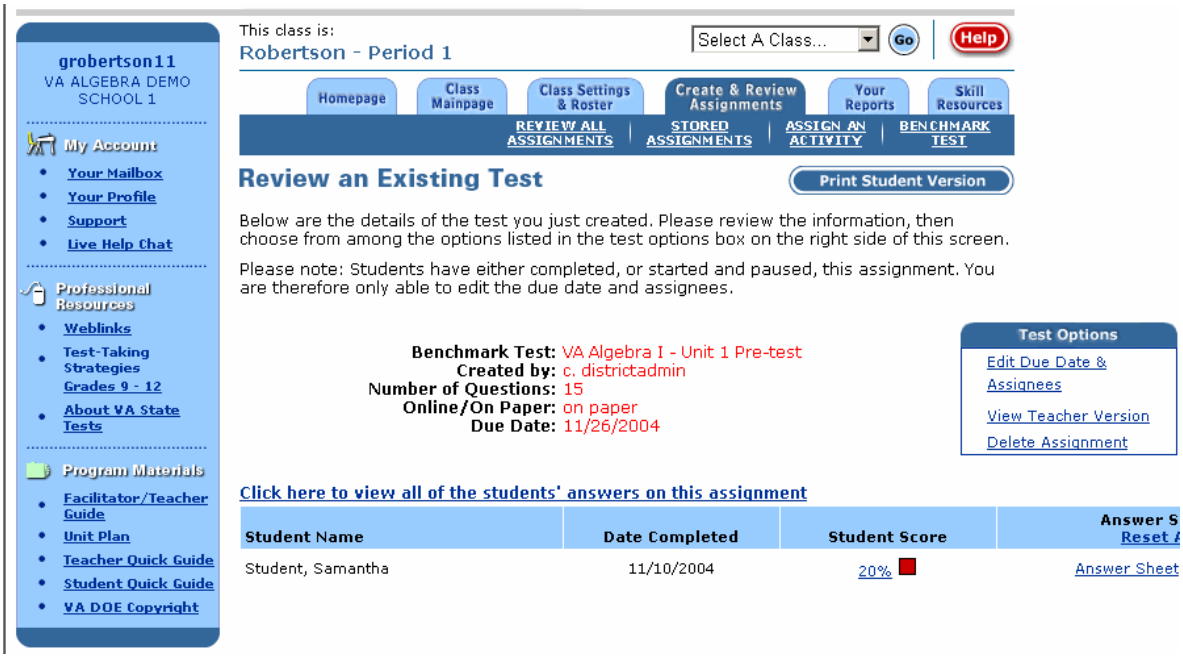
Click on the test name from the Class Mainpage. On the **Review an Existing Test** page, click **Answer Sheet**.



On the next page, enter in the student's answers by clicking on the appropriate radio button.

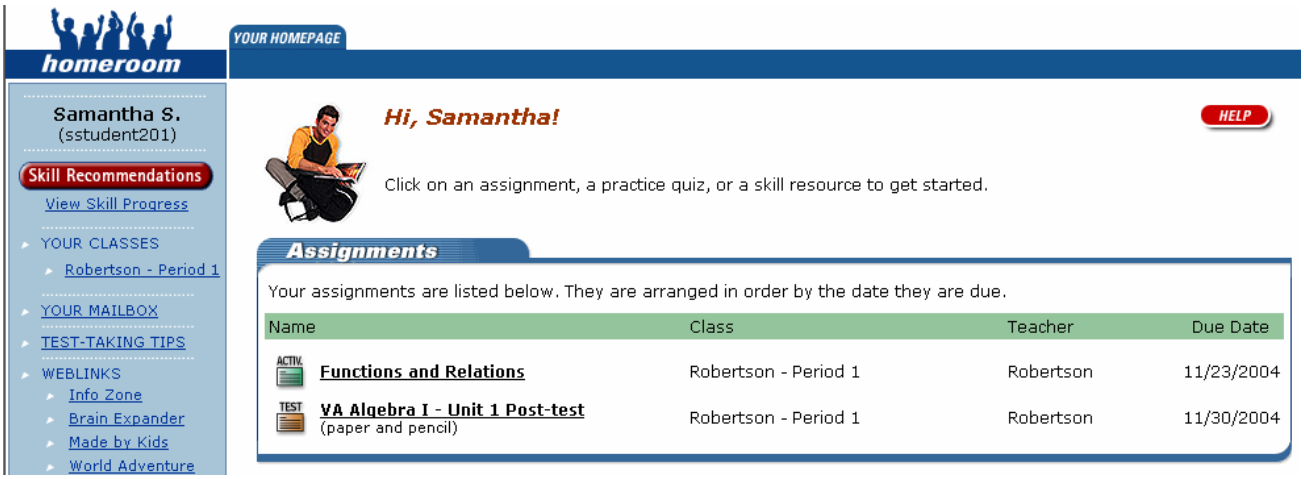


When you are done, click **Grade Test** at the bottom of the screen. The system will grade the test and the student's score will appear.



Option 2: Student enters her own responses

When the student is ready to enter her responses, she'll sign in to her account and click on the appropriate test name. Note the words (paper and pencil) indicating that the test is an on paper test.



After the student clicks **Begin Test**, a virtual scantron sheet will appear full screen. The student should transfer her answers from paper to screen, then click **Finish Test.** After doublechecking her answers one last time, she'll click **Grade This Test** on the next screen. As with an online test, student results are immediately available to both student and teacher.